

WHAT IS CLAIMED IS:

- 1 A sputter cathode target comprising:  
the target having a 100 weight percent;  
5 greater than about 90 and less than 100 weight  
percent zinc, and  
majority of balance of weight percent tin.
2. The sputter cathode target wherein the weight  
10 percent of tin is greater than zero but less than 10 weight  
percent.
3. A sputter deposited film comprising:  
a dielectric film having greater than about 90 and  
15 less than 100 weight percent zinc, and  
greater than zero but less than 10 weight percent  
tin.
4. An infrared reflective coated article  
20 comprising:  
a substrate;  
a dielectric layer sputter deposited over the  
substrate, the layer comprising a first zinc stannate film  
deposited over the substrate having zinc in weight percent  
25 range of equal to and greater than 10 and equal to and less  
than 90, and tin in the weight percent range of equal to and  
less than 90 and equal to and greater than 10, and an  
electrical enhancing film deposited over the zinc stannate  
film, the electrical enhancing film selected from the group of  
30 films consisting of zinc oxide, tin oxide film and a second  
zinc stannate film wherein the composition of the first zinc  
stannate film is at least about 5 weight percent different  
than the composition of the second zinc stannate film, and  
an infrared reflective layer deposited on the  
35 dielectric layer.

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optionally a protective film over the third dielectric layer.

10. The article of claim 9 wherein at least one of the second and third dielectric layers includes a zinc stannate film having 10-90 weight percent zinc and 90-10 weight percent tin.

11. The coating stack of claim 4 wherein the dielectric layer is a first dielectric layer and the infrared reflective layer is a first infrared reflective layer and further including:

a first metal primer layer over the first reflective layer;

a second dielectric layer over the first metal primer layer, the second dielectric layer comprising a first dielectric film and a zinc stannate film defined as a first zinc stannate film, the first zinc stannate film having zinc in the weight percent range of equal to and greater than 10 and equal to and less than 90 and tin in the weight percent range of equal to and greater than 10 and equal to and less than 90, the first dielectric layer deposited over the first metal primer layer;

a second infrared reflective layer deposited over the second dielectric layer;

a second metal primer layer deposited over the second infrared reflective layer;

a third dielectric layer deposited over the second primer layer; and

optionally a protective layer over the third dielectric layer.

12. The coating stack of claim 11 wherein the first dielectric film of the second dielectric layer comprises a zinc oxide film; a zinc oxide, tin oxide film or a zinc stannate film defined as a second zinc stannate film, the second zinc stannate film having a composition different than

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and

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the composition of the first zinc stannate film of the second dielectric layer.

13. The coating stack of claim 10 wherein the second zinc stannate film of the second dielectric layer has zinc in the weight percent range of equal to and greater than 60 and equal to and less than 90 and tin in the weight percent of equal to and greater than 10 and equal to and less than 40, and the third dielectric layer is a zinc stannate film.

14. The coating stack of claim 4 wherein the dielectric layer is a first dielectric layer and the infrared reflective layer is a first infrared reflective layer and further including:

a first metal primer layer over the first reflective layer;

a second dielectric layer over the first metal primer film;

a second infrared reflective layer over the second dielectric layer;

a second metal primer layer over the second infrared reflecting metal layer;

a third dielectric layer over the second metal primer layer, the second dielectric layer comprising a first

dielectric film and a zinc stannate film defined as a first zinc stannate film, the first zinc stannate film having zinc in a weight percent with the range of equal to and greater than 10 and equal to and less than 90 and tin within the weight percent range of equal to and less than 90 and equal to and greater than 10, the third dielectric film deposited over the second metal primer; and

optionally a protective film overlying the third dielectric film.

15. The article of claim 14 wherein the first dielectric film of the third dielectric layer is selected from the group consisting of a zinc oxide film; a zinc oxide, tin

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~~a first metal primer layer over the first reflective layer;~~

a second infrared reflective layer over the first zinc stannate film of the second dielectric layer;

a third dielectric layer over the second metal primer layer, the third dielectric layer comprising a first dielectric film and a zinc stannate film defined as a first zinc stannate film, the first zinc stannate film having zinc in a weight percent within the range of equal to and greater than 10 and equal to and less than 90 and tin within the weight percent range of equal to and less than 90 and equal to

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and greater than 10, the third dielectric film deposited over the second metal primer layer; and

optionally a protective film overlying the first zinc stannate film of the dielectric layer.

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18. The coating stack of claim 17 wherein the first dielectric film of the second dielectric layer and the first dielectric film of the third dielectric layer each has a film selected from the group consisting of zinc oxide film; zinc oxide, tin oxide film or second zinc stannate film having a composition different than the composition of the first zinc stannate film in the respective same second or third dielectric layer.

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19. The coating stack of claim 18 wherein the second zinc stannate film of the first and second dielectric layer each include zinc in the weight percent range of equal to and greater than 60 and equal to and less than 90 and tin in the weight percent of equal to and greater than 10 and equal to and less than 40.

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20. The coating stack of claim 17 wherein the second dielectric layer further includes a third dielectric film over the first zinc stannate film of the second dielectric layer.

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21. The coating stack of claim 18 wherein the second dielectric layer further includes a third dielectric film over the first zinc stannate film of the second dielectric layer wherein the third dielectric film of the second dielectric layer is a film selected from the group consisting of zinc oxide film, zinc oxide, tin oxide film and a zinc stannate film defined as a third zinc stannate film, the third zinc stannate film has a composition different than the composition of the zinc stannate film of the second dielectric layer closest to the third zinc stannate film.

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22. The coating of claim 18 wherein the second dielectric film of the <sup>second/ Dgo 4/29/99 O.A.M. 4/29/99 JJP 4/29/99</sup> dielectric layer and the second dielectric film of the third dielectric second layer each comprises a zinc oxide film; a zinc oxide, tin oxide film or a second zinc stannate film having a composition different than the <sup>composition Dgo 4/29/99 O.A.M. 4/29/99 JJP 4/29/99</sup> composition of the first zinc stannate film of third dielectric layer.

23. The coating stack of claim 220 wherein the first and third dielectric films of the second dielectric layer and the first dielectric film of the third dielectric layer each include zinc in the weight percent range of equal to and greater than 60 and equal to and less than 90 and tin in the weight percent of equal to and greater than 10 and equal to and less than 40.

24. The coating stack of claim 20 wherein the second zinc stannate film of the first dielectric layer is on the glass piece and has a thickness in the range of  $230 \pm 40$  Angstroms Å; the first zinc stannate film of the first dielectric layer is on the second zinc stannate film of the first dielectric layer and has a thickness in the range of  $80 \pm 40$  Å; the first infrared reflective metal layer is a first silver film deposited on the first zinc stannate film of the first dielectric layer and has a thickness in the range of  $110 \pm 30$  Å, the metal primer layer is a titanium film deposited on the first silver layer and has a thickness in the range of 17-26 Å; the first dielectric film of the second dielectric layer is deposited on the titanium film and has a thickness in the range of  $80 \pm 40$  Å; the first zinc stannate film of the second dielectric layer is deposited on the first dielectric film of the second dielectric layer and has a thickness in the range of  $740 \pm 40$  Å; the second infrared reflective metal layer is a second silver film deposited on the second dielectric film of the second dielectric layer and has a thickness in the range of  $110 \pm 38$  Å; the second primer film is a titanium film deposited on the second silver layer and having a thickness in

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80  $\pm$  40Å; the first zinc  
electric ~~film~~ is deposited as  
third dielectric layer and

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a substrate;

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15  dielectric layer;
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a first metal primer layer over the first infrared reflective layer;

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a second primer layer over the second reflective

a third dielectric layer over the second metal layer; and

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film having a first dielectric

29. The coated article of claim 28 wherein the first and second dielectric layers are each a zinc stannate film, and the second dielectric film of the third dielectric layer is a zinc stannate film and each of the zinc stannate

films has zinc in the weight percent range of 10-90 and tin in the weight percent range of 90-10.

5 30. The coated article of claim 29 wherein the first dielectric film of the second dielectric layer has zinc in the weight percent range of equal to and greater than 90 and equal to and less than 60 and tin in the weight percent range of equal to and greater than 10 and equal to and less than 40.

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31. A coated article comprising:  
a substrate;  
a first dielectric layer over the substrate;  
a first infrared reflective layer over the first  
15 dielectric layer;  
a first primer layer over the first reflective metal layer;  
a second dielectric layer having a first dielectric film selected from the group consisting of zinc oxide, tin  
20 oxide film and a first zinc stannate film, and a second dielectric film overlying the first dielectric film having a composition different than the first dielectric film of the second dielectric layer;  
a second infrared reflective layer over the second  
25 dielectric layer;  
a second primer layer over the second reflective layer;  
a third dielectric layer over the second metal primer layer, the third dielectric layer having a first  
30 dielectric film selected from the group consisting of a zinc oxide, tin oxide film and a first zinc stannate film and a second dielectric film, the second dielectric film of the third dielectric layer have a composition different than the composition of the second dielectric film of the third  
35 dielectric layer; and  
optionally a protective film overlying the third dielectric layer.

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32. The coated article of claim 31 wherein the first dielectric layer, the second dielectric film of the second and third dielectric layers are each a zinc stannate film having zinc in the weight percent range of 10-90 and tin in the weight percent range of 90-10.

33. The coated article of claim 32 wherein the first dielectric film of the second and third dielectric layers are each a zinc stannate film having zinc in the weight percent range of equal to and greater than 90 and equal to and less than 60 and tin in the weight percent range of equal to and greater than 10 and equal to and less than 40.

34. The coated article of claim 32 wherein the coated article is a transparency.

35. The coated article of claim 34 wherein the coated article is an automotive transparency.

36. The coated article of claim 35 wherein the automobile transparency is an automotive windshield having a pair of glass sheets laminated together and one of the sheets is fabricated from the substrate having the coating.

37. A method of making an automobile transparency comprising:

applying a coating on a glass substrate having the following:

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a first dielectric layer over a glass substrate;  
a first infrared reflecting metal layer over the first dielectric film:

a first metal primer layer over the first reflective layer;

a second dielectric layer over the first metal primer layer;

a second infrared reflective layer over the second dielectric layer;

~~a second metal primer layer over the second infrared reflective layer;~~

5 a protective film overlying the first zinc stannate  
film of the third dielectric layer, wherein at least one of  
the dielectric layers includes a first dielectric film  
selected from the group consisting of zinc oxide, tin oxide  
and a first zinc stannate film and a second dielectric film  
10 including a second zinc stannate film having a composition  
different than the first zinc stannate film and a composition  
of 10-90 weight percent zinc and 90-10 weight percent tin;

processing the coated substrate to provide a coated windshield blank wherein the processing step includes heating  
15 the coated substrate to its bending temperature and after heating the coating has reduced haze;

laminating the coated blank to another piece of glass to provide the automobile windshield.

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